

WHAT IS CLAIMED IS:

1.    An automated method for controlling a back reaming  
5    operation of a drilling rig, the method comprising:

     providing a hoisting system that moves a drill pipe  
     during a back reaming operation at a hoisting speed and a  
     hoisting torque, wherein the hoisting system comprises at  
     least one back reaming parameter sensor for measuring a  
10    corresponding at least one back reaming parameter;

     comparing a predetermined value of the at least one back  
     reaming parameter with the measured value for the at least one  
     back reaming parameter; and

     initiating a braking assembly that resists the hoisting  
15    torque of the hoisting system when the measured value of the  
     at least one back reaming parameter equals the predetermined  
     value of the at least one back reaming parameter.

2.    The method of claim 1, further comprising providing  
20    a control system, wherein the control system compares the  
     predetermined value of the at least one back reaming parameter  
     with the measured value for the at least one back reaming  
     parameter.

3.    The method of claim 2, wherein the control system  
25    initiates the braking assembly when the measured value of the  
     at least one back reaming parameter equals the predetermined  
     value of the at least one back reaming parameter.

4.    The method of claim 1, further comprising providing  
30    an operator control unit that allows an operator to input the  
     predetermined value of the at least one back reaming parameter  
     therein.

5.     The method of claim 1, wherein providing a hoisting system comprises providing a drawworks system.

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6.     The method of claim 1, wherein the at least one back reaming parameter comprises at least one back reaming parameter chosen from the group consisting of rate of hoisting of the drill pipe, pull on a drill bit of the drill pipe, 10 drilling torque applied to the drill pipe, drilling mud flow, drilling mud pressure, and formation cutting condition of mud screens within the drilling mud.

7.     An automated method for controlling a back reaming operation of a drilling rig, the method comprising:

15        providing a drawworks system that moves a drill pipe during a back reaming operation at a hoisting speed and a hoisting torque, wherein the hoisting system comprises at least one back reaming parameter sensor for measuring a 20 corresponding at least one back reaming parameter;

      providing an operator control unit that allows an operator to input a predetermined value of the at least one back reaming parameter therein;

25        providing a control system that compares the predetermined value of the at least one back reaming parameter with the measured value for the at least one back reaming parameter, wherein the control system initiates a braking assembly that resists the hoisting torque of the drawworks system when the measured value of the at least one back 30 reaming parameter equals the predetermined value of the at least one back reaming parameter.

8.     The method of claim 7, wherein the at least one back reaming parameter comprises at least one back reaming 35 parameter chosen from the group consisting of rate of hoisting

of the drill pipe, pull on a drill bit of the drill pipe,  
drilling torque applied to the drill pipe, drilling mud flow,  
5        drilling mud pressure, and formation cutting condition of mud  
screens within the drilling mud.

9.     A system that controls a back reaming operation of a  
drilling rig, the system comprising:

10       a hoisting system that moves a drill pipe during a back  
reaming operation at a hoisting speed and a hoisting torque,  
wherein the hoisting system comprises at least one back  
reaming parameter sensor for measuring a corresponding at  
least one back reaming parameter;

15       an operator control unit that allows an operator to input  
a predetermined value of the at least one back reaming  
parameter therein;

         a back reaming parameter sensor that obtains the measured  
value of the at least one back reaming parameter;

20       a control system that monitors the at least one back  
reaming parameter; and

         a braking assembly that resists the hoisting torque of  
the drawworks system when the measured value of the at least  
one back reaming parameter equals the predetermined value of  
25       the at least one back reaming parameter.

10.    The system of claim 9, wherein the control system  
monitors the at least one back reaming parameter by comparing  
the predetermined value of the at least one back reaming  
30       parameter with the measured value of the at least one back  
reaming parameter.

11.    The system of claim 10, wherein the control system  
initiates the braking assembly when the measured value of the

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at least one back reaming parameter equals the predetermined  
value of the at least one back reaming parameter.

5           12. The system of claim 9, wherein the hoisting system  
comprises a drawworks system.

10          13. The system of claim 9, wherein the at least one back  
reaming parameter comprises at least one back reaming  
parameter chosen from the group consisting of rate of hoisting  
of the drill pipe, pull on a drill bit of the drill pipe,  
drilling torque applied to the drill pipe, drilling mud flow,  
drilling mud pressure, and formation cutting condition of mud  
15 screens within the drilling mud.

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